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ABSTRACT

Results of surveys and studies suggest that too few African-American and female students aspire to and achieve doctoral degrees in biological sciences. It has also been suggested that gender and racial inequities exist in teaching and research faculties in higher education, especially in the biomedical sciences. Thus, few role models are available to encourage young students to seek courses or careers in these fields. The purpose of the Graduate Achievement Program (GAP) is to identify and recruit talented minority undergraduate students who demonstrate financial need and to provide a summer institute designed to introduce them to the opportunities and excitement of careers in the biomedical sciences. GAP was designed to provide educational resources to bolster learning abilities, build academically on the educational foundation already present, provide the opportunity to actively participate in all aspects of biomedical research, and familiarize students with the demands of graduate school through interaction with doctoral students and postdoctoral fellows. The current paper is a description of the first year of GAP including recruitment, program activities, curriculum, student descriptions, schedules, student evaluations of the program, goals and objectives, and future directions of GAP. Appendices include student demographics, student percentile ranks on Woodcock-Johnson Subtests, GAP weekly schedule of events, and a list of presentations made by GAP students. Contains 29 references. (Author/MKR)

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THE GRADUATE ACHIEVEMENT PROGRAM: A DESCRIPTION OF THE FIRST YEAR OF A SUMMER ENRICHMENT PROGRAM IN MATH AND SCIENCE FOR MINORITY UNDERGRADUATE STUDENTS

Mark T. Barisa and Carolyn Holland

University of Tennessee - Memphis

Paper presented at the annual meeting of the Mid-South Educational Research Association, November, 1993 - New Orleans, LA.

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ABSTRACT

Results of surveys and studies suggest that too few African-American and female students aspire to and achieve doctoral degrees in biological sciences. It has also been suggested that gender and racial inequities exist in teaching and research faculties in higher education, especially in the biomedical sciences. Thus, few role models are available to encourage young students to seek courses or careers in these fields.

The purpose of the Graduate Achievement Program (GAP) is to identify and recruit talented minority undergraduate students who demonstrate financial need and to provide a summer institute designed to introduce them to the opportunities and excitement of careers in the biomedical sciences. GAP was designed to provide educational resources to bolster learning abilities, build academically on the educational foundation already present, provide the opportunity to actively participate in all aspects of biomedical research, and familiarize students with the demands of graduate school through interaction with doctoral students and postdoctoral fellows. The current paper is a description of the first year of GAP including recruitment, program activities, curriculum, student descriptions, schedules, student evaluations of the program, goals and objectives, and future directions of GAP.

THE GRADUATE ACHIEVEMENT PROGRAM: A DESCRIPTION OF THE FIRST YEAR OF A SUMMER ENRICHMENT PROGRAM IN MATH AND SCIENCE FOR MINORITY UNDERGRADUATE STUDENTS

RATIONALE

The number of scientists and engineers in the United States is declining. Recent reports project a shortage of greater than half a million science and engineering professionals by the year 2010 relative to the teaching and research needs of our academic institutions and industry (Congressional Task Force on Women, Minorities, and the Handicapped in Science and Technology, 1989; Independent Colleges Office, 1991). Although faculty retirement and the decrease of the college-age population play a role in this trend, a more important and more troubling contributing factor is the steady decline in the proportion of U. S. students completing baccalaureate and advanced degrees in the sciences and engineering. This decline is also documented in the Affirmative Action Tables published by the National Research Council. For instance, in 1975, 27,082 doctorates were awarded; whereas the equivalent figure for 1990 is 24,190, a 10% decline. Despite an increased overall U. S. population during this period of time, the number of African-American doctoral recipients decreased from 999 to 828, a 17% drop. A recent study by the Educational Testing Service indicates that only 24 percent of "high

ability" African-Americans (defined as the top two percent of ACT or SAT scores) who enter four year colleges complete a degree program and gain entry into any graduate or professional school (Carmichael & Sevenair, 1991). It should also be noted, that African-Americans receive only 4% of science and engineering baccalaureates and 1% of doctorates, although they make up 12% of the population in the United States (Congressional Task Force on Women, Minorities, and the Handicapped in Science and Technology, 1988).

The extent to which African-Americans will do well in the marketplace during the next century depends, in large part, upon their mastery of math science, and computer technology (Tobias, 1992). Tobias also reports that not enough African-Americans are pursuing careers in such fields. Although African-American college graduates are entering a wider variety of occupations (Astin & Bisconti, 1973; Atwater & Simpson, 1984; El-Khawas & Bisconti, 1974; U. S. Department of Labor, 1975), they are disproportionately under employed (Cheatham, 1990) and severely underrepresented in math and science careers (Cooper, 1983; Jacobowitz, 1983; Kahle, 1982; Williams, 1979). This underrepresentation poses a serious problem for America's technological future, given the increasing percentage of African-Americans in the work force (Wiley, 1989). African-Americans, compared to whites, have reported greater interest in the social services than in scientific fields (Hager & Elton, 1971; Sewell & Martin, 1976). In addition, when they do enter a scientific career,

African-Americans often select more social orientations (Bowman, 1986). A study published by the Rand Corporation for the National Science Foundation (Oakes, 1990) concluded that African-Americans have fewer opportunities to take critical courses that prepare them for further science and mathematics study beyond algebra, geometry, and calculus. As a result, a disproportionate number of African-American students are found in low-track courses. Tobias (1992) views the enabling of African-American youths to achieve in mathematics and science as an investment in America's future in technological competition with foreign countries.

The reasons African-Americans do not enter math and science careers include childhood experiences, degree of encouragement, academic preparation, and a paucity of role models (Cooper, 1983; Reyes & Stanic, 1985). Low income and minority students have less contact with qualified science and mathematics teachers than do white, middle income, students (Oakes, 1990). This leads to less opportunities for the necessary encouragement and exposure to such career opportunities. This is important since self concept and attitudes about specific careers play prominent roles in career decision making (Super, Crites, Hummel, Moser, Overstreet, & Warmath, 1957).

To attempt to solve this problem, science enrichment programs must be provided to all students, but especially to women and minorities - groups that will comprise 85% of the new entrants to the work force by the year 2000 and that have historically been

underrepresented in these fields (Congressional Task Force on Women, Minorities, and the Handicapped in Science and Technology, 1988). While undergraduate summer enrichment programs may not translate into a better class of college students, such programs will, however, greatly benefit aspiring African American students no matter what college they attend, and they are well worth conducting for the nation's sake (Carmichael & Sevenair, 1991).

Effective strategies for providing remedies must focus on establishing programs in science, engineering, and mathematics that attempt to instill enthusiasm in students, thus increasing the likelihood that these students will remain the science, mathematics, and engineering pipeline and pursue a career in one of these fields. These strategies must include a nurturing environment, hands-on research experiences, mentoring, an interdisciplinary curriculum, a nondiscriminatory classroom climate, and a sense of belonging to a community of learners. Students understand and retain more and are more excited about science when they actively participate in the classroom and the laboratory as they grapple with scientific concepts through discussion, writing, various forms of interactive learning, and mini-research laboratory projects in which the outcome is uncertain and in which they themselves contribute to the experimental design (Carter, 1988; Independent Colleges Office, 1991; Truchan, 1988). "Hands-on" laboratory experience is especially critical for minority and women students, who often lack the experience and confidence in

working with laboratory instruments and equipment. If these students do not acquire experience and confidence early, they will be less likely to continue through the science curriculum (Carter, 1988; Denton, 1988; Independent Colleges Office, 1991; Rosser, 1990). All of the above-mentioned programs are components of the Graduate Achievement Program.

It will be important to apply these interventions beginning at the undergraduate level in order to increase the likelihood that more students will continue their undergraduate years with a clear decision to remain in the science, mathematics, and engineering fields. This is critical because it is at the undergraduate level that our future scientists and college faculty are recruited and prepared for graduate study. It is also important to thwart the projected shortfall, recruitment and retention measures for graduate school that take place at this level. Finally, it is at this level, especially during the freshman year, that students, especially women, become disillusioned with the sciences. Of students expressing an interest in the sciences, 42% drop out of the sciences after the freshman year, and another 23% defect before graduation (National Science Foundation, 1988).

THE GRADUATE ACHIEVEMENT PROGRAM: A SUMMER ENRICHMENT PROGRAM IN MATH AND SCIENCE

The purpose of the Graduate Achievement Program (GAP) is to identify and recruit talented minority undergraduate students who demonstrate financial need and to provide a summer institute designed to introduce them to the opportunities and excitement of careers in the biomedical sciences. GAP was designed to provide educational resources to bolster learning abilities, build academically on the educational foundation already present, provide the opportunity to actively participate in all aspects of biomedical research, and familiarize students with the demands of graduate school through interaction with doctoral students and postdoctoral fellows.

An aggressive program for the recruitment of female and minority graduate students was initiated with a consortium of the undergraduate colleges and universities in Memphis, Tennessee, and Fisk University in Nashville, Tennessee. Each participant participated in research directed by a mentor at UT-Memphis, wrote a summary of findings and activities at the completion of the project or research period, presented those findings at local meetings or symposia, work ed with the Professional Careers Program staff to strengthen skills, and participated in group social and/or learning activities with already enrolled graduate and postgraduate students, faculty, and alumni of UT-Memphis.

PROGRAM DESCRIPTION

University of Tennessee - Memphis

For more than 140 years, the University of Tennessee Health Science Center (UT-Memphis) has served the state and region as the primary, comprehensive public university for the education of health care professionals and biomedical scientists. UT-Memphis is also the recognized research and educational "hub" of the Memphis Medical Center, one of the oldest and largest in the nation. The total enrollment of Allied Health Sciences, Dentistry, Medicine, Nursing, Pharmacy, and Graduate Health Services is approximately 2,600 pre and postdoctoral students. UT-Memphis offers graduate instruction leading to the Master of Science and the Doctor of Philosophy degrees on numerous biomedical fields. The research mission of UT-Memphis is to provide an environment in which the student can learn by working in laboratories with faculty who are at the forefront of their disciplines. This environment includes research centers composed of collaborating scientists working in many disciplines encompassing various departments. Among more than a dozen Centers are campus-wide functions including the Neuroscience Center of Excellence, the Molecular Resource Center of Excellence, the Pediatric Pharmacokinetics and Therapeutics Center of Excellence, the Clinical Research Center, the Boling Center for Developmental Disabilities, the Newborn Center, and the Cancer Center Educational Program. The Department of Physiology and Biophysics plays an important role in

these centers from both a research aspect and a training aspect. In summary, the multidisciplinary approach utilized by UT-Memphis provides state-of-the-art research training rarely duplicated in comprehensive universities.

Student Selection

The Graduate Achievement Program serviced 42 student participants this year. The selection process for the program's first year were conducted rather quickly. Since the Graduate Achievement Program was new it was not well known and was not well publicized. Potential students were found through recommendations by professors and by personal references. Eligibility requirements for student participants included: cumulative grade point average of 3.0 or higher; strong letters of recommendation from science and/or math college professors; United States citizenship or permanent residency; minority or female students from low-income families were preferred.

Since most students discovered the program through word of mouth, there were not many applicants for the first year. Almost all applicants that met the criteria were accepted. Of those participating, 63% were women, and 68% were minority. Appendix A contains graphs depicting the demographic make-up of these students on various dementions. Each student was administered the Calculation, Applied Problems, Science, Social Studies, Humanities, Broad Math, and Broad Knowledge subtests of the Woodcock-Johnson-kevised

Tests for Achievement (WJ-R). Percentile ranks of available test scores are shown in Appendix B. As shown, there was a great deal of variability among the participating students. No statistical analyses were conducted due to the small number of students, and the large amount of variability. These assessments were administered to gain insight into each student's current achievement level. Students who continue in the program will be evaluated regularly to monitor any changes.

SUMMER INSTITUTE

Graduate Achievement Program participants (1) engaged directly in research, (2) participated in a program of workshops to stimulate their interest in biomedical science research, enhance their research skills, and improve their preparation for doctoral study and (3) attended seminars focused on the economic, cultural, and social benefits of teaching and/or research careers. Faculty and staff counseled the participants concerning the academic preparation and course selection necessary for acceptance into graduate programs and provided information about and assistance in requesting financial assistance that is available. Appendix C contains detailed schedules of the activities that each student participated in each week.

12 Week Summer Institute

ONE HOUR PER WEEK IN CLASSROOM STUDY: Participants attended a weekly "Philosophy of Science and Ethics" course presented by a senior professor of the Department of Human Values and Ethics at UT-Memphis. In addition to the course director's didactic presentation, guest scientists addressed and discussed specific, current questions involving ethics in modern and classical research. Particular attention was given to controversies such as the use of living animals as research models in basic scientific research and the ethics and morality of harvesting and transplanting human fetal brain tissue in order to alleviate neuropathology in the human adult.

SIX HOURS PER DAY IN RESEARCH LABORATORY EXPERIENCE: Each student was assigned a mentor and a well-defined scientific protocol. The students participated in the literature search, planning, and performing of experiments, running of routine analyses, analysis of data, and manuscript generation. Presentations were made in the form of a poster session during an Open House Program at the end of the Summer Institute. Whenever possible, appropriate racial and gender role models were used throughout the program.

ONE HOUR PER WEEK IN SEMINAR: This seminar series was specifically designed for the undergraduate program. The presentations were made by student participants as well as invited speakers (faculty members, graduate students, and postdoctoral fellows) from UT-Memphis. Graduate Achievement Program participants, along with the respective mentor, reported on their research project and/or discussed selected research papers. Dr. Gabor Tigyi, Assistant Professor in Physiology, was in charge of this seminar program. It met for two hours every other week.

ONE HOUR PER WEEK IN ENRICHMENT ACTIVITIES: Enrichment activities took place on a weekly basis and will included field trips to industry sponsors; seminars on careers in higher education, choosing a mentor, and the nature of graduate work from the viewpoints of black and female alumni; and self-assessment workshops. These sessions were presented by invited seminar speakers, black and female alumni, and others, i.e., counseling, enrichment workshops, seminars, lecturers, and field trips.

TWO HOURS PER WEEK IN COMPUTER CLASS: A computer class entitled "Computer Networking and the Internet" took place once a week. In this class participants learned how to use the Macintosh more effectively and how to communicate through computerized technology. The importance of this knowledge was also stressed.

ANNUAL AWARDS BANQUET: All Summer Institute participants were required to make formal presentations to the university community during an "Open House" session in August. Parents, high school and university undergraduate teachers, administrators, faculty, and other interested persons were invited to this session. The Graduate Achievement Program Directors, Dr. Leonard Johnson and Dr. Edward Schneider, attended these presentations and selected the four student projects to be recognized at the banquet. Special recognition was also given to faculty members for outstanding contributions to the program. An alumna who is a minority was invited to be the keynote speaker at the awards banquet.

FAMILY STYLE GATHERING: This gathering will take place this year and will be in the form of a picnic. It will provide a communication vehicle for the parents to interact with program staff and to allow program staff to provide information regarding the advantages of a graduate program in the biomedical sciences. Since all participants and future participants will be invited, it will also provide role model activity between the participants within the program.

Assessment Measurements of Program and Student Progress

1. At the end of the 12 week Summer Institute, a progress report was due from the student and his/her research mentor detailing the research project and the research skills attained by the student. These reports, in part, were designed to demonstrate a student's progress from a less complex scientific skill (e.g., weighing, mixing solutions, operating a pH meter) to more complex skills (e.g., tissue culture, operating an HPLC). This report was sent to the Graduate Achievement Program directors and the student and his or her mentor.

2. At the beginning or the middle of the second summer session, a Graduate Achievement Program student should have obtained the technical skills necessary to conduct a simple research project that would include work in the library to read relevant research articles; actually setting up and conducting the experiment in the laboratory; collecting, recording, and statistically evaluating the resulting data; and reviewing the work on a regular basis in laboratory group meetings. Both the research mentor and the second-year Graduate Achievement Program student will be informed of this expectation.

3. At the end of the Summer Institute, an evaluation of the student by the mentor was required. This evaluation questionnaire

asked the mentor to comment on the student's (a) ability to properly utilize scientific equipment, (b) ability to collect reproducible data, (c) ability to understand methods of data analysis, and (d) ability to defend his/her findings before peer review. Other factors relating to professional behavior were also included.

4. At the end of the Summer Institute, an evaluation of the program and the mentor by the student was required. This evaluation questionnaire asked the student to comment on the mentor's (a) ability to relate to the student's career goals in line with the program goals, (b) time commitment to the student and the program (c) teaching abilities, and (d) research resources. In addition, each student was asked to comment on the program as a whole, to list strengths and weaknesses, and to offer suggestions on improvement. Each student was asked to make a commitment to continue in the program as a second-year student or as a role model for future participants.

5. Each student was expected to write a paper at the completion of the 12 week research project. This paper tested the student's ability to organize scientific data and to present it in a coherent manner while concentrating on presenting and evaluating a specific scientific hypothesis. In addition, a poster session was required for the Graduate Achievement Program "Open House" program.

6. The program directors had lunch on a weekly basis with all Graduate Achievement Program participants and met individually with the Graduate Achievement Program participants and his/her respective mentor at the mid-point of and at the end of the Summer Institute. These meetings included a discussion of program progress, problem areas, student's goals and objectives, and program fit in correspondence to the student's needs.

7. All students were required to maintain a grade of "B" or better on all summer term academic curricula. This quality performance measurement is consistent to that required of graduate studies in general.

8. Prior to the competing renewal of the Graduate Achievement Program application, an External Advisory Committee will be asked to participate in an on-site evaluation of the program and the upcoming initiatives. At present, this committee has two members: Dr. Frederick Shair, Dean of Arts and Sciences, California State University in Long Beach; and Dr. James Rinick, Vice President of Academic Affairs, George Mason University. This committee will talk with the Graduate Achievement Program leadership, administrative, and program staff, and present and past Graduate Achievement Program students. This committee will evaluate both the present program and future initiatives.

9. A Graduate Achievement Program registry will be established to follow all participants from the application phase through adulthood. This type of telephone follow-up will provide a measurement of Graduate Achievement Program achieved end results and information on generational influences of Graduate Achievement Program.

SOME PROBLEMS AND RECOMMENDATIONS

1. STUDENT SELECTION: As mentioned previously, the students for the summer of 1993 were chosen from a very small applicant pool. The Graduate Achievement Program is in the process of contacting many university and college science and mathematics departments to notify them of our program and to solicit potential applicants. The Graduate Achievement Program administration is working very closely with the Memphis Challenge Program to ensure the selection of quality students. Last year, the students were administered achievement tests over the summer as part of the Summer Institute. In the upcoming year, students will be administered the Woodcock-Johnson-Revised and any other potential assessments before the selection process is complete. This will help in the selection process, and will not interrupt the Summer Institute as the testing had a tendency to do last year. Also, by testing before the Institute begins we can be sure that all students are tested. There was some difficulty in scheduling to accommodate all of the students last year.

2. STUDENT MENTOR SELECTION: There were some problems that arose in the mentoring process last year. Some of the mentors did not adhere to the research protocol they developed prior to the beginning of the program. Some mentors had to be reminded continuously that the students were in the labs to conduct research, not

to clean glass, etc. Most of the mentors worked well with their students. It was a select few that require closer scrutiny in the future. Some mentors will not be asked to work with the program in the upcoming year. The evaluations of the mentors by the students and contact by the Graduate Achievement Program administrators gave good insight into which mentors should be asked to return. Matching student interests to mentors was not a difficulty, and is not a foreseeable problem in the future.

3. SCHEDULE OF EVENTS: Next years weekly schedule will be somewhat different than last year. The schedule will be much more structured, and will allow for more extensive lab periods than before. Some of the mentors and students complained that the students needed to be in the lab for more hours of the day. In order to accomplish this without eliminating the other activities some revisions of the schedule will be made. These revisions have not yet been complete, but will move much of the coursework and class time to two full days and allow for full days to be devoted only to lab work.

4. METHOD OF PAYMENT: Last year all of the students were paid a stipend each month. This stipend was based on 40 hours per week. Many students did not attend all of the classes, and sometimes missed their labs. Due to the method of payment, they lost no pay for their missed events. Next year the payment structure will be based on how much work was accomplished rather than how many hours were worked. Students will have certain requirements to meet every week.

If those requirements are met each week, they will be paid in full. If they are not met, appropriate amounts will be deducted from their paycheck. This should be used as more of an incentive then the hourly wage paid previously. This should also lead to better attendance to seminars and class programs.

5. CLASS IN DIVERSITY TRAINING: One of the biggest lessons that the students and the staff learned this year is that the participants must learn about other cultures and how to deal with them. In programs such as this, that are designed for minority students rather than majorities, there is an apparent power shift. Whites who are used to being the majority are now in the minority. The reverse is true for the minority students. At times, there was a great deal of racial tension within the group as the students adjusted to their new roles. To avoid as much of this as possible, a class in diversity training will be conducted early in the program to teach the students how to deal with their feelings about others, and communicate their feelings and ideas effectively. without insulting others. The issues that arose from these difficulties will be discussed in more detail in a later paper.

6. INCREASED STRUCTURE IN THE PROGRAM: As mentioned in the payment and scheduling sections, there were some problems associated with a lack of structure. Students seemed to begin to develop their own schedules toward the end of the program as their posters were due. They spent much more time in their labs than in their classes. In the upcoming year, due dates will be established as part

of the weekly requirements so that students will have an easier time finishing their projects in a timely manner without waiting until the last minute. Also, roll will be called on a regular basis at all activities to ensure participation in all activities. The previous year allowed students too much freedom and it had a tendency to be abused. Also, staff will take a more active role in seeing that students are attending their required classes. More homework and weekly quizzes will be added to ensure involvement with the classroom portions of the program.

REFERENCES

American Association for the Advancement of Science (1990). The liberal art of science: Agenda for action. Washington, DC: Author.

Astin, H. S. & Bisconti, A. S. (1973). Career plans of Black and other non-White college graduates. Bethlehem, PA: CPC Foundation.

Atwater, M. M. & Simpson, R.D. (1984). Cognitive and affective variables affecting black freshman in science and engineering at a predominantly white university. School Science and Mathematics, 84, 100-112.

Carmichael, J. W. Jr. & Sevenair, J. P. (1991). Preparing minorities for science careers. Issues in Science and Technology, 7, 55-60.

Carter, C. (1988). Images of science and learning in sciences: Recognizing and changing images of science in science instruction. Seminar presented at "Engaging the Inquiring Mind: Approaches to Learning in Math and Sciences."

Cheatham, H. E. (1990). Africentricity and career development of African Americans. Career Development Quarterly, 38, 334-346.

Congressional Task Force on Women, Minorities, and the Handicapped in Science and Technology (1988). Changing America: The new face of science and engineering, interim report. Washington, DC: Author

Congressional Task Force on Women, Minorities, and the Handicapped in Science and Technology (1989). The new face of science and engineering, final report. Washington, DC: Author.

Cooper, C. (1983). Discriminant factors in the choice of a non-traditional "Math and Science Oriented" versus a traditional "People-oriented" career for black students. Paper presented at the Annual Convention of the American Psychological Association, Anaheim, CA, August 26-30, 1983. (ED241855).

Denton, D. (1988). Why kids of all ages turn off to science. Seminar presented at "Engaging the Inquiring Mind: Approaches to Learning in Math and Sciences."

El-Khawas, E. L. & Bisconti, A. S. (1974). Five and ten years after college entry (Research Report No. 1). Washington, DC: American Council on Education.

Hager, P. & Elton, C. (1971). Tough vocational interests of Black males. Journal of Vocational Behavior, 1, 153-158.

Independent Colleges Office, Project Kaleidoscope (1991). What works: Building natural science communities, 1. Washington, DC: Statmats Communications, Inc.

Jacobowitz, T. (1983). Relationship of sex, achievement, and science self-concept to the science career preferences of Black students. Journal of Research in Science Teaching, 84, 100-112.

Kahle, J. B. (1982). Can positive minority attitudes lead to achievement gains in science? Analysis of the 1977 National Assessment of Education Process, Attitudes Towards Science. Science Education, 66, 539-546.

National Science Board Task Committee on Undergraduate Science and Engineering Education (1986). Undergraduate science, mathematics, and engineering education. Washington, DC: Author.

National Science Foundation (1988). Future scarcities in engineering, mathematics, and the sciences: Draft report. Washington, DC: Author.

Oakes, J. (1990). Multiplying inequalities: The effects of race, social class, and tracking on opportunities to learn mathematics and science. Santa Monica, CA: The Rand Corporation.

Post, P., Stewart, M. A., and Smith, P. L. (1991). Self- efficacy, interest, and consideration of math/science and non-math/science occupations among Black freshman. Journal of Vocational Behavior, 38, 179-186.

Reyes, L. H. & Stanic, G. M. A. (1985, April). A review of the literature on Blacks and mathematics. Paper presented at the meeting of the American Educational Research Association, Chicago, IL.

Rosser, S. V. (1990). Female-friendly? Science. New York: Pergamon Press.

Sewell, T. E. & Martin, R. P. (1976). Racial differences in patterns of occupational choice in adolescents. Psychology in the Schools, 13, 326-333.

Super, D. E., Crites, J. O., Hummel, R. C., Moser, H. P., Overstreet, P. L., and Warmath, C. G. (1957). Vocational development: A framework for research. New York: Bureau of Publication, Teachers' College, Columbia University.

Tobias, R. (1992). Math and science education for African-American youth: A curriculum challenge. NASSP Bulletin, 76, 42-48.

Tobias, S. (1990). They're not dumb, they're different: Stalking the second tier. Tucson, AZ: Research Corporation.

Truchan, L. (1988). Teaching for abilities in the context of the discipline: Active learning. Seminar presented at "Engaging the Inquiring Mind: Approaches to Learning in Math and Sciences."

U. S. Department of Labor. (1975). Handbook of labor statistics. Washington, DC: U. S. Government Printing Office.

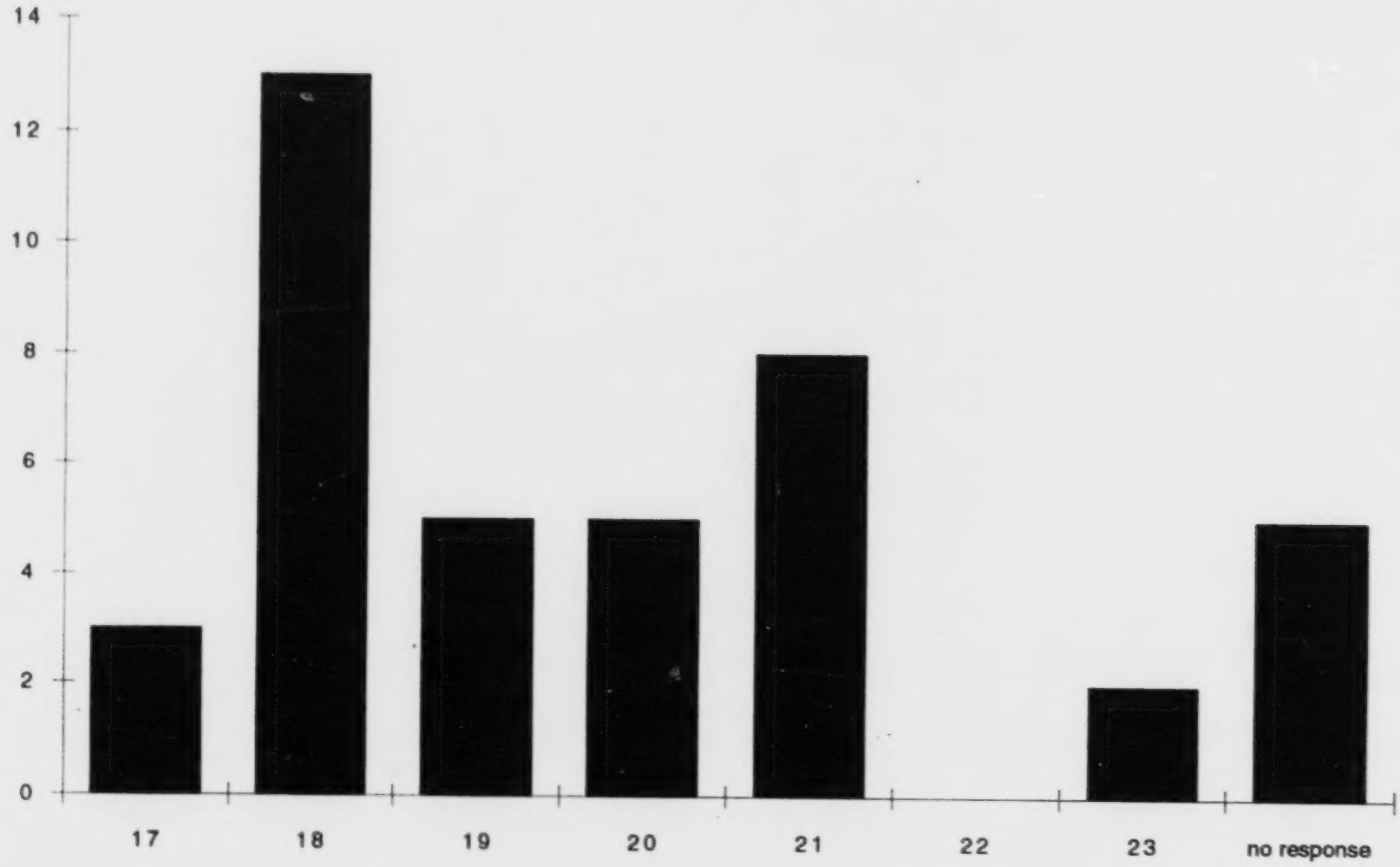
Wiley, E. (1989). Minorities key to maintaining nation's competitive edge, analyst says. Black Issues in Higher Education, 5, 13.

Williams, J. H. (1979). Career counseling for the minority student: Should it be different? Journal of Non-White Concerns in Personnel and Guidance, 7, 176-182.

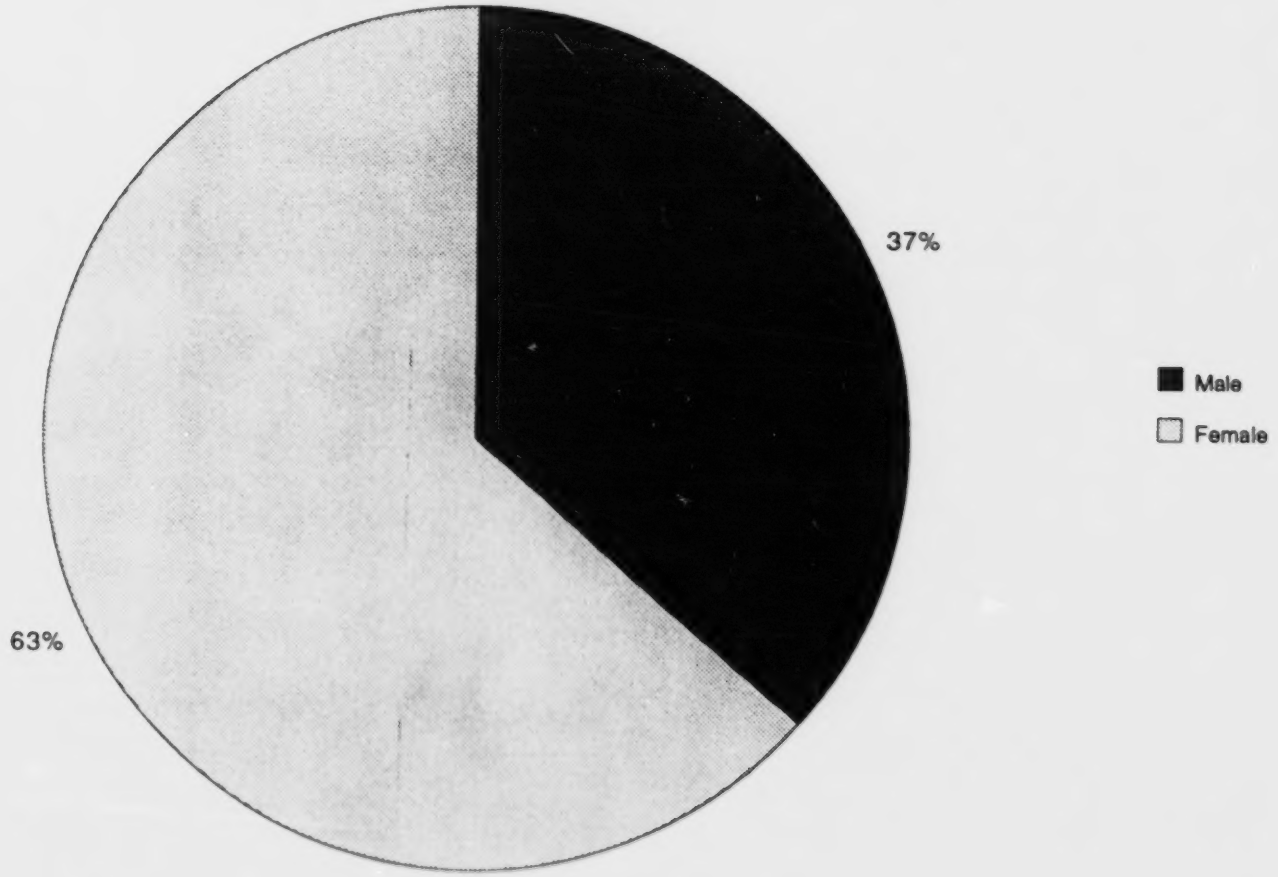
APPENDIX A

STUDENT DEMOGRAPHICS

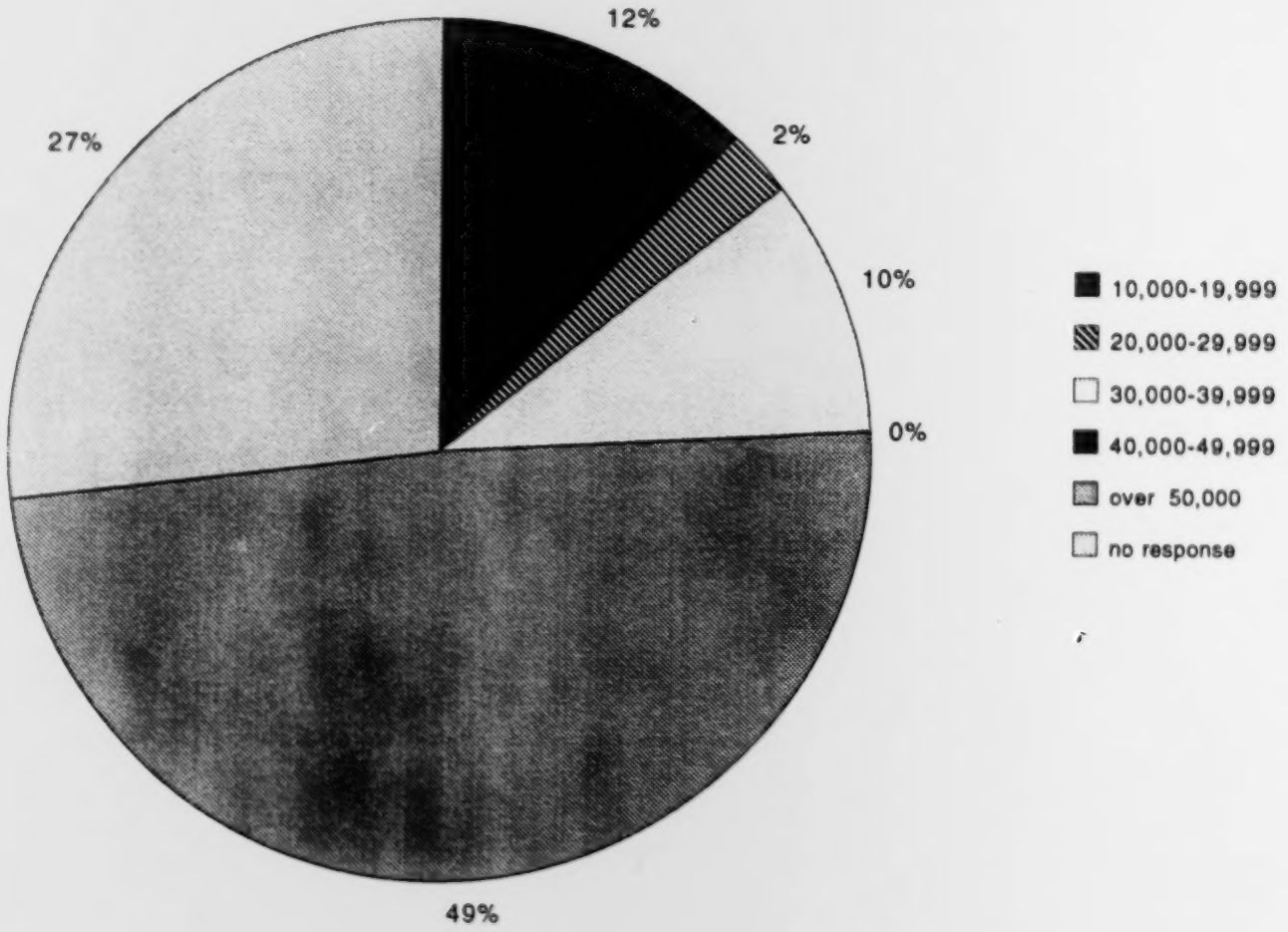
GAP STUDENTS GROUPED BY AGE



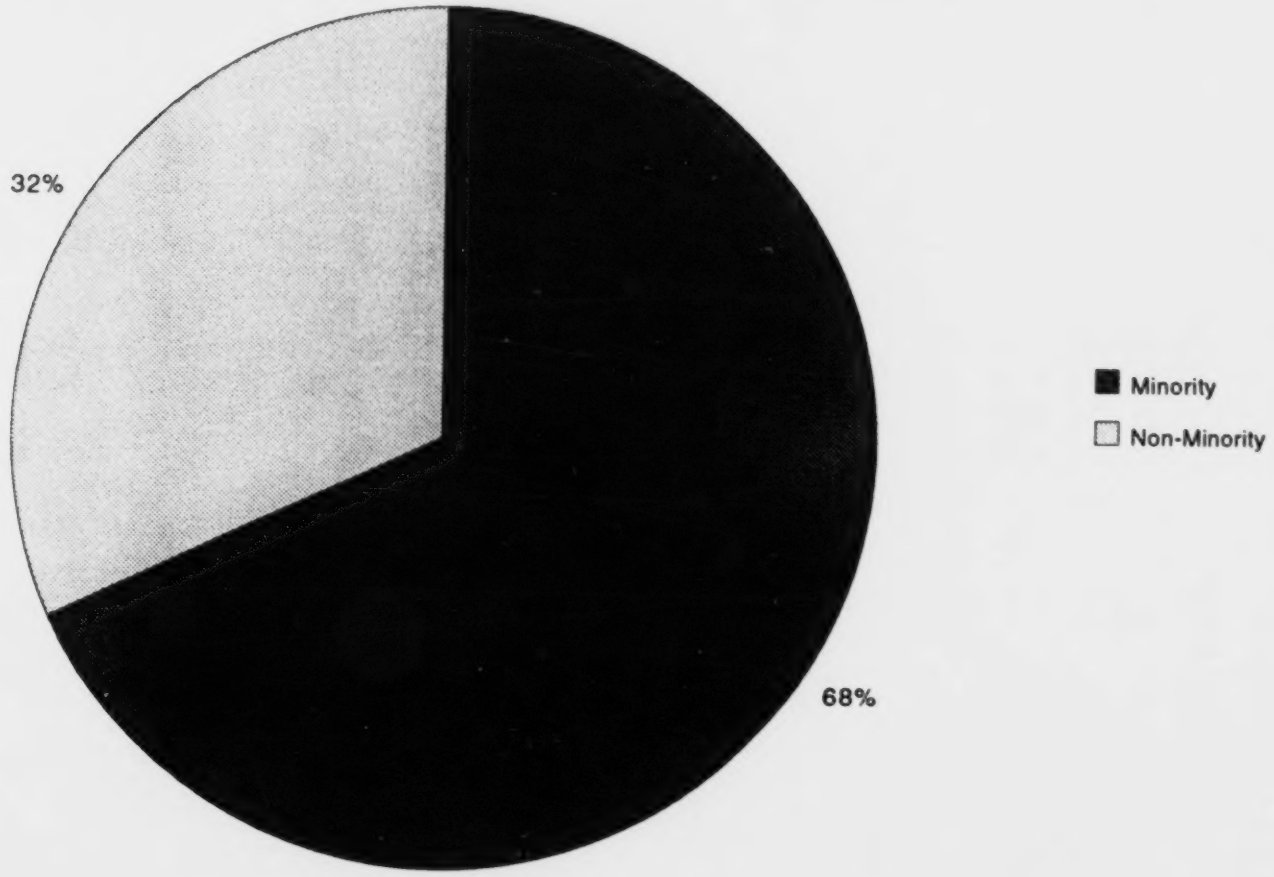
GAP STUDENTS GROUPED BY GENDER



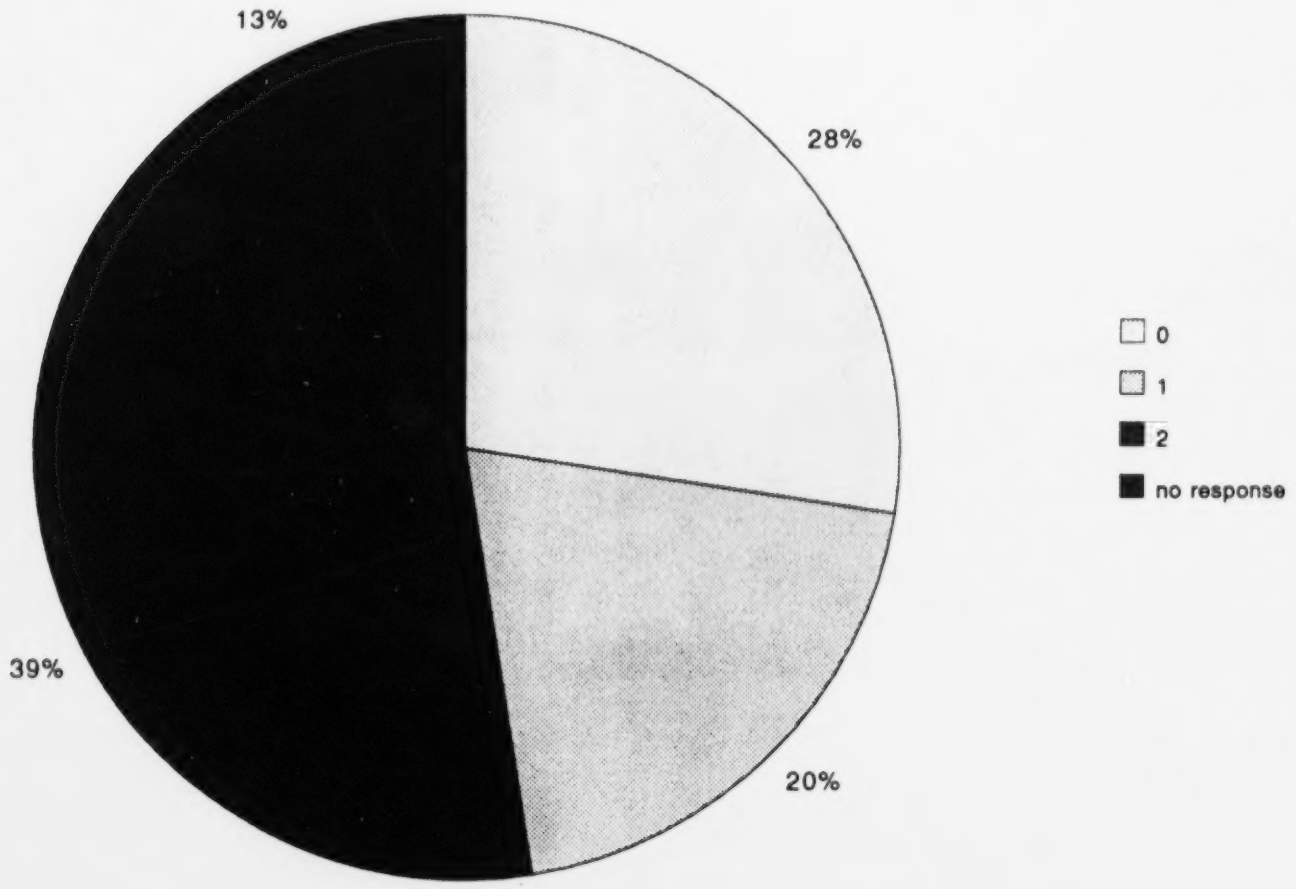
GAP STUDENTS GROUPED BY HOUSEHOLD INCOME



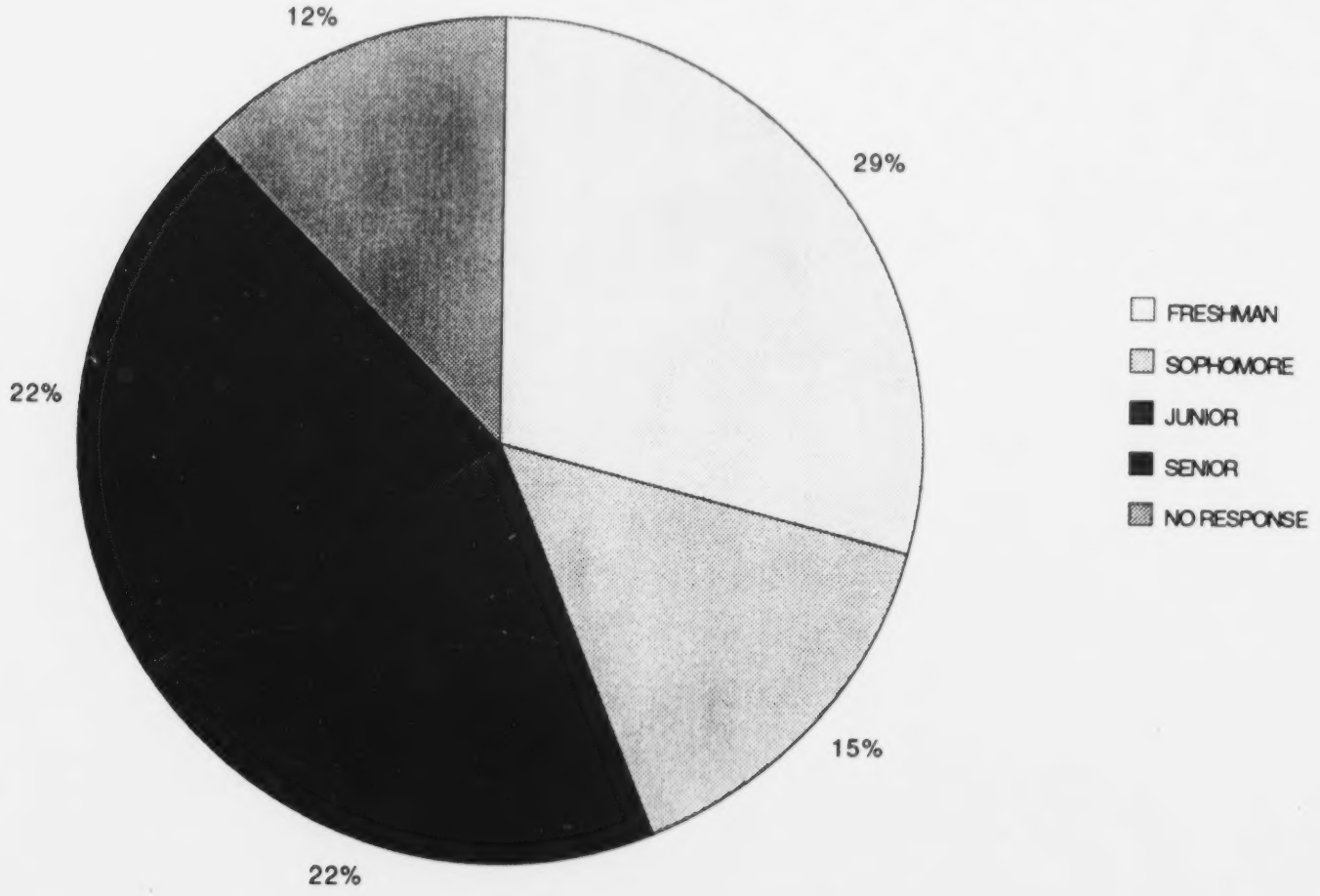
GAP STUDENTS GROUPED BY ETHNIC MINORITY STATUS



GAP STUDENTS GROUPED BY NUMBER OF PARENTS WITH ADVANCED DEGREES



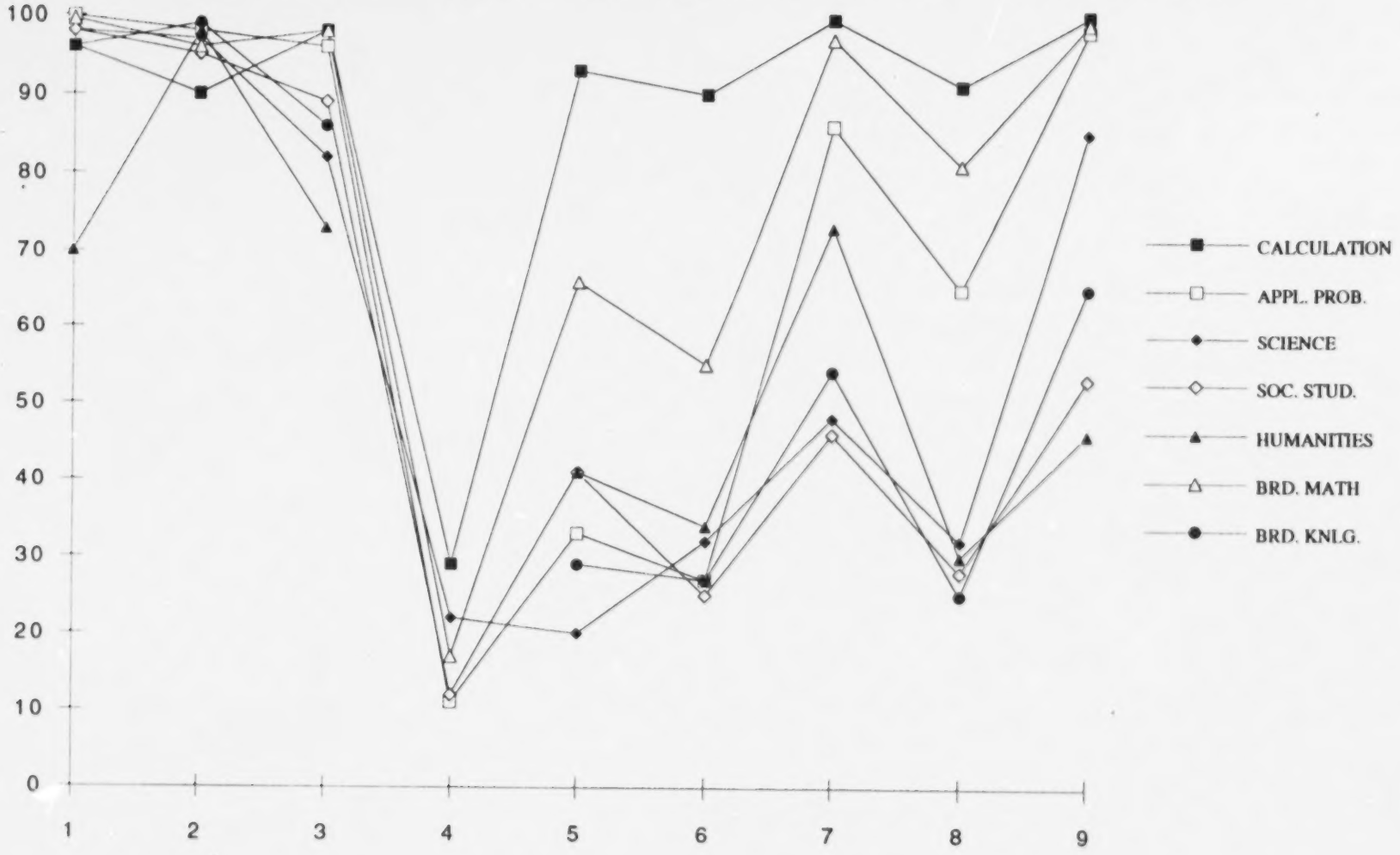
GAP STUDENTS GROUPED BY YEAR IN SCHOOL



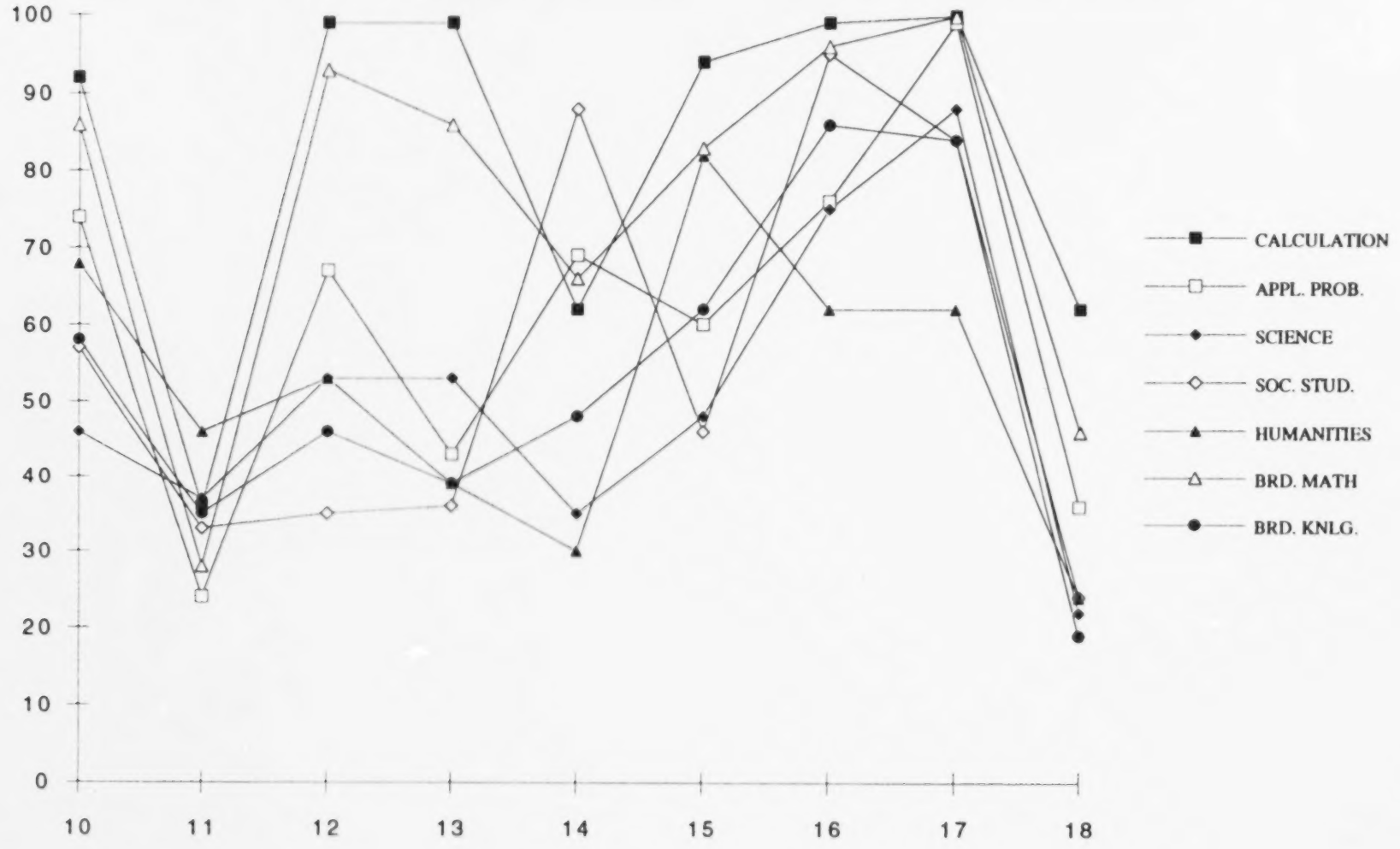
APPENDIX B

STUDENT PERCENTILE RANKS ON WJ-R

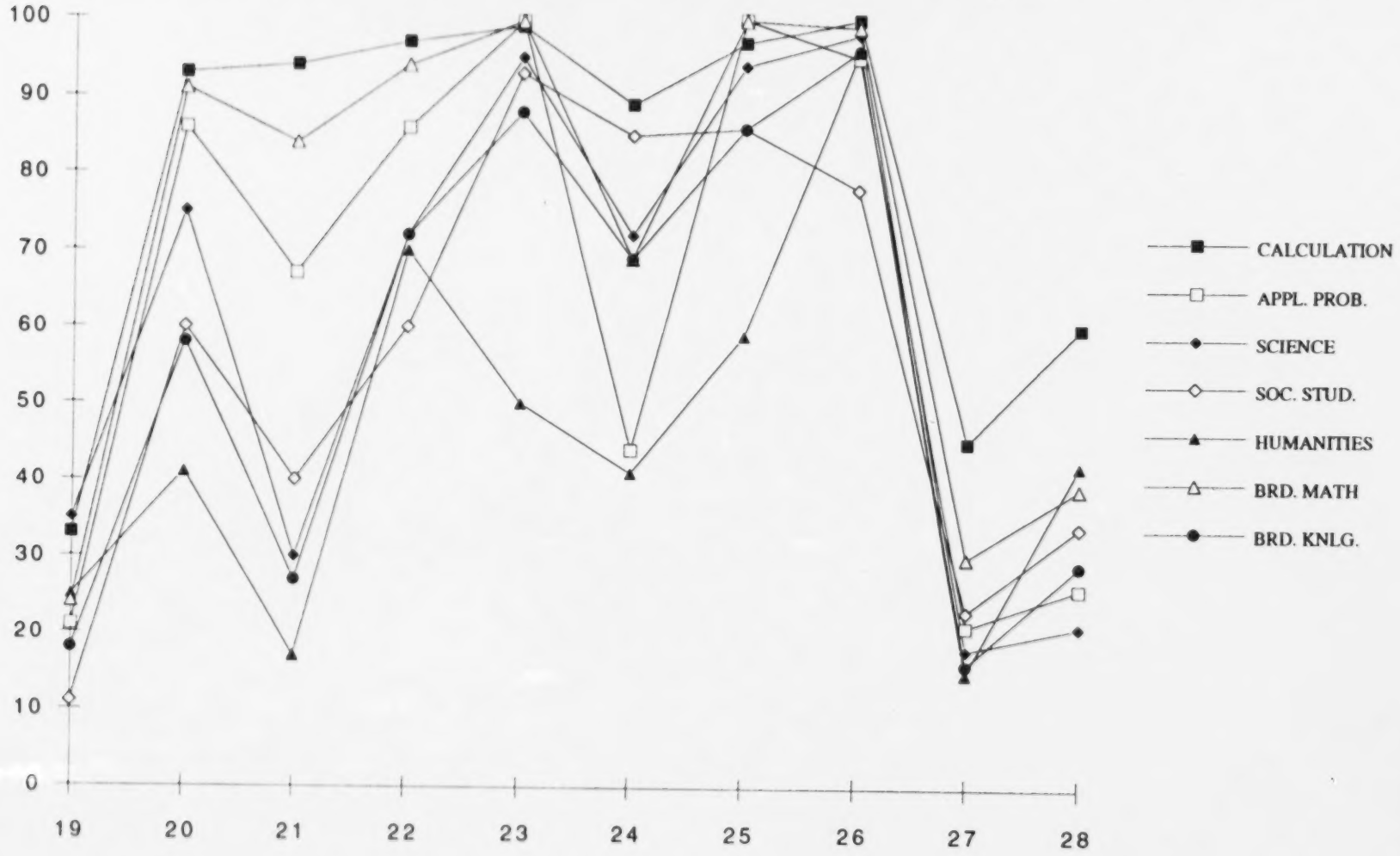
GAP STUDENT PERCENTILE RANKS ON WOODCOCK-JOHNSON SUBTESTS



GAP STUDENT PERCENTILE RANKS ON WOODCOCK-JOHNSON SUBTESTS



GAP STUDENT PERCENTILE RANKS ON WOODCOCK-JOHNSON SUBTESTS



APPENDIX C

GAP WEEKLY SCHEDULE OF EVENTS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #1	24-May-93	25-May-93	26-May-93	27-May-93	28-May-93
8:00 - 9:30 a.m.	Orientation/Pretesting	Library Orientation	Enrichment Program:	Philosophy of Science and Ethics	Lab Experience
	Ms. Joy Hardy		Self Assessment Workshop	GEB	
			GEB	Ms. Rebecca Wasson	
9:30 - 10:30	Orientation (cont'd)	~~Lab Experience~~	Enrichment Activity:	Meeting: Peer Advisory Group	Lab Experience (cont'd)
			Computer Networking and the Internet	Nash Annex Lobby	
			201 Nash Building		
			Mr. Larry Tague		
10:00 - 11:00	Orientation (cont'd)	~~Lab Experience~~ (cont'd)	Apple Computer Lab Workshop	Apple Computer Lab Workshop	Lab Experience (cont'd)
			201 Nash Building	201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	
	and Dr. Schneider				
12:00 - 1:00	Orientation	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Orientation (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Orientation (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Orientation (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00	Orientation (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 2 - GRADUATE ACHIEVEMENT PROGRAM

WEEK #2	MONDAY 31-May-93	TUESDAY 1-Jun-93	WEDNESDAY 2-Jun-93	THURSDAY 3-Jun-93	FRIDAY 4-Jun-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program: Self Esteem Workshop GEB	Enrichment Program: Careers in High Education Dr. Charlotte Kennedy GEB	Philosophy of Science and Ethics GEB Ms. Rebecca Wasson	Lab Experience
9:30 - 10:30	Lab Experience	Lab Experience	Enrichment Activity: Computer Networking and the Internet 201 Nash Building Mr. Larry Tague	Meeting: Peer Advisory Group Nash Annex Lobby	Lab Experience (cont'd)
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop 201 Nash Building	Apple Computer Lab Workshop 201 Nash Building	Lab Experience (cont'd)
11:00 - 12:00	Lunch - SAC with Dr. Johnson and and Dr. Schneider	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session Ms. Holland and Ms. Hardy	Lunch - SAC with Corporate Partners
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Seminar Program Link Auditorium Dr. Gabor Tigyi	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00	Seminar Program (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 3 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #3	7-Jun-93	8-Jun-93	9-Jun-93	10-Jun-93	11-Jun-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program:	Enrichment Program:	Philosophy of Science and Ethics	Lab Experience
		Panel Discussion: Opportunities	Financial Planning	GEB	
		in Higher Education	GEB	Ms. Rebecca Waseon	
		GEB			
9:30 - 10:30	Lab Experience	Lab Experience	Enrichment Activity:	Meeting: Peer Advisory Group	Lab Experience (cont'd)
			Computer Networking and the Internet	Nash Annex Lobby	
			201 Nash Building		
			Mr. Larry Tague		
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Apple Computer Lab Workshop	Lab Experience (cont'd)
			201 Nash Building	201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	
	and Dr. Schneider				
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 4 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK 84	14-Jun-93	15-Jun-93	16-Jun-93	17-Jun-93	18-Jun-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program:	Creative Writing	Philosophy of Science and Ethics	Lab Experience
		Academic Planning	301 Nash Building	GEB	
		for Higher Education	Ms. Judy Kitts	Ms. Rebecca Wasson	
		GEB			
9:30 - 10:30	Lab Experience	Lab Experience	Enrichment Activity:	Meeting: Peer Advisory Group	Lab Experience (cont'd)
			Computer Networking and the Internet	Nash Annex Lobby	
			201 Nash Building		
			Mr. Larry Tague		
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Apple Computer Lab Workshop	Lab Experience (cont'd)
			201 Nash Building	201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	with Corporate Partners
	and Dr. Schneider				
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Seminar Program	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
	Link Auditorium				
	Dr. Gabor Tigyi				
4:00 - 5:00	Seminar Program (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 5 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #5	21-Jun-93	22-Jun-93	23-Jun-93	24-Jun-93	25-Jun-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program:	Creative Writing	Philosophy of Science and Ethics	Lab Experience
		Exceptional Black Scientists	301 Nash Building	GEB	
		GEB	Ms. Judy Kitts	Ms. Rebecca Wasson	
		Mr. Clarke Baker			
9:30 - 10:30	Lab Experience	Lab Experience	Lab Experience	Meeting: Peer Advisory Group	Lab Experience (cont'd)
				Nash Annex Lobby	
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Lab Experience (cont'd)
				201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	
	and Dr. Schneider				
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 6 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #6	28-Jun-93	29-Jun-93	30-Jun-93	1-Jul-93	2-Jul-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program: Pharmacy Graduate Program	Creative Writing 301 Nash Building Ms. Judy Kitts	Philosophy of Science and Ethics GEB Ms. Rebecca Wasson	Lab Experience
9:30 - 10:30	Lab Experience	Lab Experience	Lab Experience	Meeting: Peer Advisory Group Nash Annex Lobby	Lab Experience (cont'd)
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop 201 Nash Building	Lab Experience (cont'd)
11:00 - 12:00	Lunch - SAC with Dr. Johnson and and Dr. Schneider	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session Ms. Holland and Ms. Hardy	Lunch - SAC with Corporate Partners
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Seminar Program Link Auditorium Dr. Gabor Tigyi	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

Week 7 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #7	5-Jul-93	6-Jul-93	7-Jul-93	8-Jul-93	9-Jul-93
8:00 - 9:30 a.m.	HOLIDAY - 4th July	Enrichment Program:	Creative Writing	Philosophy of Science and Ethics	Lab Experience
		Anatomy & Neurobiology	301 Nash Building	GEB	
		Graduate Program	Ms. Judy Kitts	Ms. Rebecca Wasson	
9:30 - 10:30		Lab Experience	Lab Experience	Meeting: Peer Advisory Group	Lab Experience (cont'd)
				Nash Annex Lobby	
10:00 - 11:00		Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Lab Experience (cont'd)
				201 Nash Building	
11:00 - 12:00		Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
				Ms. Holland and Ms. Hardy	
12:00 - 1:00		Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00		Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00		Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00		Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00		Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 6 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #6	12-Jul-93	13-Jul-93	14-Jul-93	15-Jul-93	16-Jul-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program:	Creative Writing	Philosophy of Science and Ethics	Lab Experience
		Microbiology and Immunology	301 Nash Building	GEB	
		Graduate Program	Ms. Judy Kitts	Ms. Rebecca Wasson	
9:30 - 10:30	Lab Experience	Lab Experience	Lab Experience	Meeting: Peer Advisory Group	Lab Experience (cont'd)
				Nash Annex Lobby	
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Lab Experience (cont'd)
				201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	with Corporate Partners
	and Dr. Schneider				
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Seminar Program	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
	Link Auditorium				
	Dr. Gabor Tigyi				
4:00 - 5:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 9 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #9	19-Jul-93	20-Jul-93	21-Jul-93	22-Jul-93	23-Jul-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program:	Creative Writing	Philosophy of Science and Ethics	Lab Experience
		Pathology Graduate Program	301 Nash Building	GEB	
			Ms. Judy Kitts	Ms. Rebecca Wasson	
9:30 - 10:30	Lab Experience	Lab Experience	Lab Experience	Meeting: Peer Advisory Group	Lab Experience (cont'd)
				Nash Annex Lobby	
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Lab Experience (cont'd)
				201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	
	and Dr. Schneider				
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 10 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #10	26-Jul-93	27-Jul-93	27-Jul-93	28-Jul-93	29-Jul-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program:	Creative Writing	Philosophy of Science and Ethics	Lab Experience
		Biochemistry Graduate Program	301 Nash Building	GEB	
			Ms. Judy Kitts	Ms. Rebecca Wasson	
9:30 - 10:30	Lab Experience	Lab Experience	Lab Experience	Meeting: Peer Advisory Group	Lab Experience (cont'd)
				Nash Annex Lobby	
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Lab Experience (cont'd)
				201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	with Corporate Partners
	and Dr. Schneider				
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Seminar Program	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
	Link Auditorium				
	Dr. Gabor Tigyi				
4:00 - 5:00	Seminar Program (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 11 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #11	2-Aug-93	3-Aug-93	4-Aug-93	5-Aug-93	6-Aug-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program:	Creative Writing	Philosophy of Science and Ethics	Lab Experience
		Pharmacology Graduate Program	301 Nash Building	GEB	
			Ms. Judy Kitts	Ms. Rebecca Wasson	
9:30 - 10:30	Lab Experience	Lab Experience	Lab Experience	Meeting: Peer Advisory Group	Lab Experience (cont'd)
				Nash Annex Lobby	
10:00 - 11:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Apple Computer Lab Workshop	Lab Experience (cont'd)
				201 Nash Building	
11:00 - 12:00	Lunch - SAC	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session	Lunch - SAC
	with Dr. Johnson and			Ms. Holland and Ms. Hardy	
	and Dr. Schneider				
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Lab Experience
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
3:00 - 4:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)
4:00 - 5:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)

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Week 12 - GRADUATE ACHIEVEMENT PROGRAM

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK #12	9-Aug-93	10-Aug-93	11-Aug-93	12-Aug-93	13-Aug-93
8:00 - 9:30 a.m.	Library Time	Enrichment Program: Physiology and Biophysics Graduate Program	Creative Writing 301 Nash Building Ms. Judy Kitts	Philosophy of Science and Ethics GEB Ms. Rebecca Wasson	Finalizing Open House
9:30 - 10:30	Finalizing Open House	Finalizing Open House	Finalizing Open House	Meeting: Peer Advisory Group Nash Annex Lobby	Finalizing Open House
10:00 - 11:00	Finalizing Open House	Finalizing Open House	Finalizing Open House	Apple Computer Lab Workshop 201 Nash Building	Finalizing Open House
11:00 - 12:00	Lunch - SAC with Dr. Johnson and and Dr. Schneider	Lunch - SAC	Lunch - SAC	Lunch - SAC - Feedback Session Ms. Holland and Ms. Hardy	Lunch - SAC
12:00 - 1:00	Lab Experience	Lab Experience	Lab Experience	Lab Experience	Finalizing Open House
1:00 - 2:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Finalizing Open House
2:00 - 3:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Finalizing Open House
3:00 - 4:00	Seminar Program Link Auditorium Dr. Gabor Tigyi	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Open House
4:00 - 5:00	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Lab Experience (cont'd)	Open House
					6:30 Banquet

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APPENDIX D

LIST OF PRESENTATIONS MADE BY YMSP AND GAP STUDENTS

Advancing Science Education through Research for Underrepresented Groups

1993 SUMMER POSTER SESSION
DEPARTMENT OF PHYSIOLOGY & BIOPHYSICS
THE UNIVERSITY OF TN, MEMPHIS

1. NAME: **ANDERSON,** Swanette
   TITLE: Confocal Microscopy of Dye I Stain in Human and Animal Lenses.
   AUTHORS: Swanette Anderson and A. Avakian, M.D., Ph.D.

2. NAME: **AUSTIN,** Gregory
   TITLE: Factors Influencing Urinary Albumin Excretion in Children
   AUTHORS: Gregory Austin, G. Harshfield, Ph.D.

3. NAME: **BONNER,** Latosha
   TITLE: Aspects of Medical Photography
   AUTHORS: Carmen Cleveland, Latosha Bonner, Thurman Hobson, Mgr., and Eddie Jones, Medical Photographer.

4. NAME: **AYERS,** Brenda
   ITLE: Duplication of XP21: Effect in Sexual Development
   AUTHORS: Brenda Ayers, S. Wachtel, G. Wachtel, O. Mitelman

5. NAME: **BRADLEY,** Leanora
   TITLE: Comparison of Direct Hybridization and Amplicor to Cell Culture for Detection of Chlamydia and Gonorrhea in Obsteric Patients.
   AUTHORS: Leanora Bradley, Dr. V. Baselski and Dr. Marion.

6. NAME: **BANGER,** Shemeka
   TITLE: Experimental Techniques for Solid Phase Extractions
   AUTHORS: Shemeka J. Banger, GAP, Fernanedez, Dr. Stafford

7. NAME: **BRIGGS,** Amy L.
   TITLE: Neutrophil O_2-Production Under Hypertonic Conditions.
   AUTHORS: Amy L. Briggs and Michael J. Pabst, Ph.D.

8. NAME: **BUSSELL,** John L.
   TITLE: Changes in Tooth Position During Orthodonic Treatment: Analysis of Class II Extraction Cases.
   AUTHORS: John L. Bussell and Edward F. Harris, Ph.D.

9. NAME: **BOYD,** Valeria
   TITLE: Genetics Assay for Small Fragments Bacteria Phase ØX174 DNA
   AUTHORS: Valeria Boyd, GAP, C. Hutchison, III, M. Eddell

10. NAME: **BEAN,** Tanya
    TITLE: Anastomoses and Overlapping of Peripheral Nerves in the Paw of the Cat
    AUTHORS: Tanya Bean, GAP, Eldridge Johnson, Ph.D.

11. NAME: **GAILLARD,** Ian
    TITLE: Site-Directed Mutagenesis of Pseudorabies Virus Glycoprotein gIII
    AUTHORS: I. Gaillard, GAP,S. Flynn, M.Tomilo, C. Edwards, P. Ryan

12. NAME: **DUMAS,** Shuvonne
TITLE: The Effect of Polyamine on Corneal Epithelial Wound Healing.
AUTHORS: Shuvonne Dumas and Mitchell A. Watsky, Ph.D.

13. NAME: **BRAXTON,** Kristi N.
TITLE: Effect of Bicarbonate and SDS on Bacterial Detachment from Pellicles
AUTHORS: Kristi N. Braxton, GAP, Jegdish P. Babu, PhD.

14. NAME: **EDRINGTON,** Jamie
TITLE: Effects of Endothelial Injury *In Vivo* Upon Autoregulatory Vasodilation in Response to Hypotension.
AUTHORS: Jamie Edrington, Tim Eidson and Charles W. Leffler, Ph.D.

15. NAME: **BURKS,** Tunisa
TITLE: Tone Protocol
AUTHORS: Tunisa Burks, GAP, W. Applegate, PhD.

16. NAME: **TILLMAN,** Margaret
TITLE: Changes in Tooth Position During Orthodonic Treatment: Analysis of Class II Extraction Cases
AUTHORS: John L. Bussell and Edward F. Harris, Ph.D.

17. NAME: **BURSE,** Connie
TITLE: Cerebral Vasoconstruction and Prostanoid Synthesis in Response to Low $C0_2$ and High $C0_2$ in Smooth Muscle and Endothelial Cells
AUTHORS: Connie Burse, GAP, John Paul Murrell III GaP, Maria A. Luiza C. Albuquerque, Pauline Hsu, Charles W. Leffler, Ph.D.

18. NAME: **HARRIS,** LaJoyce
TITLE: Scholar's Trip to Blanchard Spring Caverno August '93.
AUTHORS: LaJoyce Harris

19. NAME: **CASEY,** Candace
TITLE: Mutations in the p53 Gene in Human Malignancy
AUTHORS: Candace M. Casey and S. Wachtel, Ph.D.

20. NAME: **HILL,** Felicia
TITLE: The Role of Platelets in Blood Clotting.
AUTHORS: Felicia Hill and Eugene Eckstein, Ph.D.

21. NAME: **CASEY,** Monique
TITLE: Identification and Characterization of the β-subunit of Human Lymphocyte Methionine Adenosyl-Transferase
AUTHORS: Monique Casey, Malak Kotb, H. Leighton LeGros, Jr.

22. NAME: **DAWSON,** Alexia
TITLE: Random Mutagenesis of the D_2 Dopamine Receptor
AUTHORS: Alexia Dawson and Susan Senogles, Ph.D.

23. NAME: **BURKS,** Kenya
TITLE: EDRF and Prostanoids in Cerebral Arteriolar responses to acetylcholine in juvenile pigs
AUTHORS: Kenya Burks, GAP, Michael Harris, GAP, S. Zuckerman and Charles W. Leffler, Ph.D.

24. NAME: **DONALD,** Robin
TITLE: The Biochemical Purification of Slow-Containing Protein in Rat Bone
AUTHORS: Robin Donald, GAP, Satoru K. Nishimoto, Ph.D.

---

25. NAME: **LEWIS,** Joann
TITLE: Anatomy of a Turbocharged Short-Tailed Mammal Burrowing Through TCP/IP. RE: Turbogopher.
AUTHORS: Joann Lewis, Larry Tague and Jonathan Jeffrey.

---

26. NAME: **DORSEY,** Kelli
TITLE: The Effects of Dopamine Agonists on Secretion from Adrenal Chromaffin Cells
AUTHORS: Kelli Dorsey, GAP, Mary K. Dahmer, Ph.D.

---

27. NAME: **MARSHALL,** Frakeetta
TITLE: Structure-Activity Relationship of Lysophosphatidic Acid Action.
AUTHORS: Frakeetta Marshall and Corey Wallace.

---

28. NAME: **DOUGLASS,** Julie
TITLE: Cloning and Characterization of the Sequences Downstream of the PUB12-5 Polyubiqiutin Gene of Trypanosomia CRUZ1
AUTHORS: Julie Douglass, Sobha Hariharen and John Swindle

---

29. NAME: **EDWARDS,** Adrian
TITLE: Postnatal Changes in the distribution of Callosal Cell Bodies in the Cat
AUTHORS: Edward Adrian, GAP,. Andrea Elberger, Ph.D., and Diana Dodson, Ph.D, Sylvia and Christy

---

30. NAME: **MARTIN,** Adrienne
TITLE: Influences of Low Dosage of Indomethacin on Cerebral Arterioles.
AUTHORS: Adrienne Martin, Massroor Pourcyrous, M.D., Stanley Lopez and Charles W. Leffler, Ph.D.

---

31. NAME: **GLASS,** Tamyra
TITLE: β-adrenergic Stimulation and Protein Phosphorylation of Enzymatically Isolated Cardiac Myocytes
AUTHORS: Tamyra Glass, GAP, Karen Gannaway ,GAP, John Lange, J. William Lester and Polly Hofmann, Ph.D.

---

32. NAME: **MONTGOMERY,** Bianca
TITLE: The Study of Cell and Molecular Pathology.
AUTHORS: Bianca Montgomery and Dr. Stan Blatti.

---

33. NAME: **GRANDBERRY,** Deidrea
TITLE: The Separation of Phosphorylated and Non-phosphorylated Peptides by Using HPLC: The Effect of Ion-Pairing Reagents on Retention Time
AUTHORS: Deidrea Grandberry, GAP, Chhabil Dass, Ph.D., P. Mahalaskshmi, Ph.D.

---

34. NAME: **MOORE,** Ferrell
TITLE: Effects of Sleep Deprivation in Rabbits.
AUTHORS: Ferrell Moore and Levente Kapás, M.D.

---

35. NAME: **BHATTACHARYA**, Julie
TITLE: Nitroblve Tetrazolium Reduction Testing in Assessing the role of cell separation in polymorphonuclear leukocytes and monocyte activation
AUTHORS: Julie Bhattacharya, Michael J. Pabst, PhD.

---

36. NAME: **HOLMES**, Thaddrick T.
TITLE: The Cardioprotective Effect of Adenosine is Lost in the Globally Ischemic Rat Heart
AUTHORS: Thaddrick T. Holmes, GAP, Gibson K. Orikji, Ph.D., Kafait U. Malik, Ph.D.

---

37. NAME: **COSBY**, Sherrye D.
TITLE: Physical Characterization of Ovalbumin mRNA Structural Mutants
AUTHORS: Sherrye D. Cosby, GAP, Carla Reed, YMS, Charles Liarakos, Ph.D.

---

38. NAME: **HUDSON**, Ashley
TITLE: Cloning Dystrophin using E. coli
AUTHORS: Ashley Hudson, GAP, Harry Jarrett, Ph.D., Elizabeth Brown

---

39. NAME: **JEFFREY**, Jonathan L
TITLE: Characterization of Thymus and Keratinocyte Nuclear Factor which Bind to the Serum Response Element
AUTHORS: Jonathan L. Jeffrey GAP, Stanley P. Blatti, Ph.D.

---

40. NAME: **JOHNSON**, Christie
TITLE: The Measurment of Leukocyte Activation with Flow Cytometry
AUTHORS: Carlton, Pugh, Christie Johnson and Dr. Kenneth Proctor

---

41. NAME: **REDD**, Jason
TITLE: The Effects of FadR on gene Fusions in Different Strains of cells
AUTHORS: Jason Redd and Concetta DiRusso

---

42. NAME: **KOURY**, Jadd
TITLE: Preliminary Genetic Dissection of the trans-Splicing Mechanism of *Trypanosoma cruzi*
AUTHORS: Jadd Koury, GAP, R. D. Gillespie, J. Swindle

---

43. NAME: **LLOYD**, Kendra
TITLE: Evaluation of Antitumor of New Anthracyclines by Clonogenic Assay
AUTHORS: Kendra Lloyd and Yoshikhiro Koseki, Ph.D

---

44. NAME: **REDD**, Ray
TITLE: The Connection Between the Corpus Collosum and the Visual Cortex.
AUTHORS: Ray Redd and Andrea J. Elberger.

---

45. NAME: **MCKINNEY**, Pamela
TITLE: Effects of C14 Chain Length Modulation of N-Benzylabriamycin-14Zalerate (AB 198) on Cytotoxicity and Subcellular Drugs Distribution in AB 198-Resistance J774.2 Cells
AUTHORS: P. McKinney, GAP, N. Lothstein, PhD., T. Sweatman, Ph.D.

---

46. NAME: **ROGERS**, Reginald
TITLE: Milk Cholesterol Concentration--is it related to milk fat, Triglyceride, and is it affected ty the Genotype (Breed) or Nutrition of the Cows that produce it?
AUTHORS: Reginald Rogers, GAP, D. Nutting, Ph.D.

---

47. NAME: **SAFLEY**, Elliot
TITLE: The Effect of EDF on the Doubling Time of IEC-6 Cells
AUTHORS: Elliot Safley, GAP, Shirley McCormack, Ph.D.

48. NAME: **REDMON**, Karen
TITLE: Exercise-induced c-Fos Expression in Rat Brain.
AUTHORS: Karen Redmon and Akinniran Oladehin, Ph.D., P.T.

49. NAME: **SAUNDERS**, Brook
TITLE: Significantly Diminished Serum Copper and Zinc Levels in Patients with Severe Thermal Injury
AUTHORS: Brook A. Saunders, GAP, S.K. Bhattachaya, Ph.D.

50. NAME: **SIGMAN**, Christine
TITLE: Sexual Dimorphismin in Nitric oxide Synthase blockade
AUTHORS: C. Sigman,GAP, J. Miller, H. Liu, M.D., Y.X. Wang, M.D., L. Share, Ph.D., and J. Crofton, Ph.D.

51. NAME: **REDWING**, Allen
TITLE: The Measurement of Water Intake and Body Weight in Male and Female Rats.
AUTHORS: Allen Redwing, Justin Miller, Christy Sigman, Xi Yin Wang, M.D., Leonard Share, Ph.D. and Joan Crofton.

52. NAME: **SMITH**, Kesha and Puryear, Demecca
TITLE: Effects of Indomethacin on the Potentiation of Vasoconstruction Induced by Cerebral Hematoma
AUTHORS: Kesha Smith, GAP, Demecca Puryear, GAP, MomohYakubu, Ph.D., and Charles W. Leffler, Ph.D.

53. NAME: **SOMOGYI**, Chris
TITLE: Intrecellular Adhesion Molecule-1 Expression Induced by Interleukin-1
AUTHORS: Chris Somogyi, GAP, Racheal Floyd, Ph.D. and James M. Krueger, Ph.D.

54. NAME: **SMITH**, Gerrifrances
TITLE: Antimicrobial Susceptibility Patterns of Gram Negative Rods Isolated From Bronchoalveolar Lavage.
AUTHORS: GerrifrancesSmith,Rosalyn Pruitt (MHSRAP) and Bereneice Madison, Ph.D.

55. NAME: **STARR**, Brian
TITLE: The Effects of Changes in Intracellular pH on Orinthine Decarboxylase Activity
AUTHORS: Brian Star, GAP, Mr. Larry Tague

56. NAME: **SYMKO**, Aaron
TITLE: Detecting Heart Rejection.
AUTHORS: Aaron Symko and S. Cardoso, M.D., Ph.D.

57. NAME: **TOOLEY**, Dawn D.
TITLE: Tumor Necrosis Factor-Binding Protein (TNF-BP) Suppresses Slow-Wave Sleep in in Rabbits
AUTHORS: Dawn D. Tooley, GAP, L. Kapás, Ph.D, J. M. Krueger, Ph.D.

58. NAME: **WHITESIDE**, Robert
TITLE: The Skills I Developed and Mastered in Lab this Summer

AUTHORS: Robert J. Whiteside, GAP, Akinniran Oladehin, Ph.D., PT

---

59. NAME: **WALLACE,** Corey
TITLE: Structure-Activity Relationship of Lysophosphatidic Acid Action.
AUTHORS: Frakeetta Marshall and Corey Wallace.

---

60. NAME: **WILLIAMS,** Sheria
TITLE: Regulation Blood Flow
AUTHORS: Sheria Williams, GAP, Steve Bealer, Ph.D.

---

61. NAME: **WASHINGTON,** Daniel
TITLE: Gene Therapy in Bacteria.
AUTHORS: Daniel Washington and Paul N. Black, Ph.D.

---

62. NAME: **WEST,** Nico
TITLE: Characterization of Cell Membrane Proteins by Immunoblotting.
AUTHORS: Nico West, Juraj Okolicany, Ph.D. and Aviv Hassid, Ph.D.

---

63. NAME: **WEST,** Tracey
TITLE: Special Problem Unit
AUTHORS: Tracey West, Mary Hames, MA, William Murphy, Ph.D.

---

64. NAME: **JONES,** Rushelle
TITLE: Contrast Sensitivity in Human Infants
AUTHORS: Rushelle Jones, GAP,.Susan Carlson, Ph.D.

---

65. NAME: **STRONG,** Cedric
TITLE: Analysis of Mutant Retrovirus Genes Selected with Altered Retrovirus Vectors
AUTHORS: Cedric Strong, GAP, Lorraine Albritton, Ph.D.

---

66. NAME: **BELL,** Brien
TITLE: Acute C-fos Induced Expression of Areas of the Brain Active During Dehydration
AUTHORS: Brien Bell, GAP, Robert S. Waters, Ph.D.

---

67. NAME: **STUART,** Melissa
TITLE: Analyses of the relative Avidity of spontaneous ante-DNA antibodies from autoimmune mice for DNA from different species

---

68. NAME: **WALLACE,** Nikki
TITLE: Antibodies to DNA
AUTHORS: Nikki Wallace, GAP, Gay Spears, GAP,and Dr. Tony Marion

---

69. NAME: **WOODSON,** Roland T. Jr.
TITLE: Effects of surfuctant upon Transmembrane Permeation of AD32
AUTHORS: Roland T. Woodson, Jr., GAP, Trevor W. Sweatman, Ph.D.